

SEQUENCE LISTING

(1) GENERAL INFORMATION

- (i) APPLICANT: Svendsen, Allan
Xu, Feng
- (ii) TITLE OF THE INVENTION: LACCASE MUTANTS
- (iii) NUMBER OF SEQUENCES: 10
- (iv) CORRESPONDENCE ADDRESS:
(A) ADDRESSEE: Novo Nordisk of North America, Inc.
(B) STREET: 405 Lexington Avenue
(C) CITY: New York
(D) STATE: NY
(E) COUNTRY: USA
(F) ZIP: 10174
- (v) COMPUTER READABLE FORM:
(A) MEDIUM TYPE: Diskette
(B) COMPUTER: IBM Compatible
(C) OPERATING SYSTEM: DOS
(D) SOFTWARE: FastSEQ for Windows Version 2.0
- (vi) CURRENT APPLICATION DATA:
(A) APPLICATION NUMBER: to be assigned
(B) FILING DATE: 15-SEP-1999
(C) CLASSIFICATION:
- (viii) ATTORNEY/AGENT INFORMATION:
(A) NAME: Green, Reza
(B) REGISTRATION NUMBER: 38,475
(C) REFERENCE/DOCKET NUMBER: 5200.210-US
- (ix) TELECOMMUNICATION INFORMATION:
(A) TELEPHONE: 212-867-0123
(B) TELEFAX: 212-878-9655

(2) INFORMATION FOR SEQ ID NO: 1:

- (i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 539 amino acids
(B) TYPE: amino acid
(C) STRANDEDNESS: single
(D) TOPOLOGY: linear
- (ii) MOLECULE TYPE: protein
- (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 1:
- | | | | | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|----|----|----|----|
| Met | Phe | Lys | Asn | Leu | Leu | Ser | Phe | Ala | Leu | Leu | Ala | Ile | Ser | Val | Ala | 1 | 5 | 10 | 15 |
| Asn | Ala | Gln | Ile | Val | Asn | Ser | Val | Asp | Thr | Met | Thr | Leu | Thr | Asn | Ala | 20 | 25 | 30 | |
| Asn | Val | Ser | Pro | Asp | Gly | Phe | Thr | Arg | Ala | Gly | Ile | Leu | Val | Asn | Gly | 35 | 40 | 45 | |
| Val | His | Gly | Pro | Leu | Ile | Arg | Gly | Gly | Lys | Asn | Asp | Asn | Phe | Glu | Leu | 50 | 55 | 60 | |
| Asn | Val | Val | Asn | Asp | Leu | Asp | Asn | Pro | Thr | Met | Leu | Arg | Pro | Thr | Ser | 65 | 70 | 75 | 80 |

Ile	His	Trp	His	Gly 85	Leu	Phe	Gln	Arg	Gly 90	Thr	Asn	Trp	Ala	Asp 95	Gly
Ala	Asp	Gly	Val 100	Asn	Gln	Cys	Pro	Ile 105	Ser	Pro	Gly	His	Ala 110	Phe	Leu
Tyr	Lys	Phe 115	Thr	Pro	Ala	Gly	His 120	Ala	Gly	Thr	Phe	Trp 125	Tyr	His	Ser
His	Phe 130	Gly	Thr	Gln	Tyr	Cys 135	Asp	Gly	Leu	Arg	Gly 140	Pro	Met	Val	Ile
Tyr 145	Asp	Asp	Asn	Asp	Pro 150	His	Ala	Ala	Leu	Tyr 155	Asp	Glu	Asp	Asp	Glu 160
Asn	Thr	Ile	Ile	Thr 165	Leu	Ala	Asp	Trp	Tyr 170	His	Ile	Pro	Ala	Pro 175	Ser
Ile	Gln	Gly	Ala 180	Ala	Gln	Pro	Asp	Ala 185	Thr	Leu	Ile	Asn	Gly 190	Lys	Gly
Arg	Tyr	Val 195	Gly	Gly	Pro	Ala	Ala 200	Glu	Leu	Ser	Ile	Val 205	Asn	Val	Glu
Gln	Gly 210	Lys	Lys	Tyr	Arg	Met 215	Arg	Leu	Ile	Ser	Leu	Ser	Cys	Asp	Pro
Asn 225	Trp	Gln	Phe	Ser	Ile 230	Asp	Gly	His	Glu	Leu 235	Thr	Ile	Ile	Glu	Val 240
Asp	Gly	Gln	Leu	Thr 245	Glu	Pro	His	Thr	Val 250	Asp	Arg	Leu	Gln	Ile 255	Phe
Thr	Gly	Gln	Arg 260	Tyr	Ser	Phe	Val	Leu 265	Asp	Ala	Asn	Gln	Pro 270	Val	Asp
Asn	Tyr	Trp 275	Ile	Arg	Ala	Gln	Pro 280	Asn	Lys	Gly	Arg	Asn 285	Gly	Leu	Ala
Gly 290	Thr	Phe	Ala	Asn	Gly	Val 295	Asn	Ser	Ala	Ile	Leu	Arg	Tyr	Ala	Gly
Ala 305	Ala	Asn	Ala	Asp	Pro 310	Thr	Thr	Ser	Ala	Asn 315	Pro	Asn	Pro	Ala	Gln 320
Leu	Asn	Glu	Ala	Asp 325	Leu	His	Ala	Leu	Ile 330	Asp	Pro	Ala	Ala	Pro 335	Gly
Ile	Pro	Thr 340	Pro	Gly	Ala	Ala	Asp	Val 345	Asn	Leu	Arg	Phe	Gln 350	Leu	Gly
Phe	Ser	Gly 355	Gly	Arg	Phe	Thr	Ile 360	Asn	Gly	Thr	Ala	Tyr 365	Glu	Ser	Pro
Ser	Val 370	Pro	Thr	Leu	Leu	Gln 375	Ile	Met	Ser	Gly	Ala 380	Gln	Ser	Ala	Asn
Asp 385	Leu	Leu	Pro	Ala	Gly	Ser	Val	Tyr	Glu	Leu 395	Pro	Arg	Asn	Gln	Val 400
Val	Glu	Leu	Val	Val 405	Pro	Ala	Gly	Val	Leu 410	Gly	Gly	Pro	His	Pro 415	Phe
His	Leu	His	Gly 420	His	Ala	Phe	Ser	Val 425	Val	Arg	Ser	Ala	Gly 430	Ser	Ser
Thr	Tyr	Asn 435	Phe	Val	Asn	Pro	Val 440	Lys	Arg	Asp	Val	Val 445	Ser	Leu	Gly

Val	Thr	Gly	Asp	Glu	Val	Thr	Ile	Arg	Phe	Val	Thr	Asp	Asn	Pro	Gly
450							455					460			
Pro	Trp	Phe	Phe	His	Cys	His	Ile	Glu	Phe	His	Leu	Met	Asn	Gly	Leu
465					470					475					480
Ala	Ile	Val	Phe	Ala	Glu	Asp	Met	Ala	Asn	Thr	Val	Asp	Ala	Asn	Asn
				485					490					495	
Pro	Pro	Val	Glu	Trp	Ala	Gln	Leu	Cys	Glu	Ile	Tyr	Asp	Asp	Leu	Pro
			500					505					510		
Pro	Glu	Ala	Thr	Ser	Ile	Gln	Thr	Val	Val	Arg	Arg	Ala	Glu	Pro	Thr
		515					520					525			
Gly	Phe	Ser	Ala	Lys	Phe	Arg	Arg	Glu	Gly	Leu					
	530					535									

(2). INFORMATION FOR SEQ ID NO: 2:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 499 amino acids
- (B) TYPE: amino acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 2:

Gly	Ile	Gly	Pro	Val	Ala	Asp	Leu	Thr	Ile	Thr	Asn	Ala	Ala	Val	Ser
1				5					10					15	
Pro	Asp	Gly	Phe	Ser	Arg	Gln	Ala	Val	Val	Val	Asn	Gly	Gly	Thr	Pro
			20					25					30		
Gly	Pro	Leu	Ile	Thr	Gly	Asn	Met	Gly	Asp	Arg	Phe	Gln	Leu	Asn	Val
		35					40					45			
Ile	Asp	Asn	Leu	Thr	Asn	His	Thr	Met	Leu	Lys	Ser	Thr	Ser	Ile	His
	50					55					60				
Trp	His	Gly	Phe	Phe	Gln	Lys	Gly	Thr	Asn	Trp	Ala	Asp	Gly	Pro	Ala
65					70				75						80
Phe	Ile	Asn	Gln	Cys	Pro	Ile	Ser	Ser	Gly	His	Ser	Phe	Leu	Tyr	Asp
				85					90					95	
Phe	Gln	Val	Pro	Asp	Gln	Ala	Gly	Thr	Phe	Trp	Tyr	His	Ser	His	Leu
			100					105					110		
Ser	Thr	Gln	Tyr	Cys	Asp	Gly	Leu	Arg	Gly	Pro	Phe	Val	Val	Tyr	Asp
		115					120					125			
Pro	Asn	Asp	Pro	Ala	Ala	Asp	Leu	Tyr	Asp	Val	Asp	Asn	Asp	Asp	Thr
	130					135					140				
Val	Ile	Thr	Leu	Val	Asp	Trp	Tyr	His	Val	Ala	Ala	Lys	Leu	Gly	Pro
145					150					155					160
Ala	Phe	Pro	Leu	Gly	Ala	Asp	Ala	Thr	Leu	Ile	Asn	Gly	Lys	Gly	Arg
				165					170					175	
Ser	Pro	Ser	Thr	Thr	Thr	Ala	Asp	Leu	Ser	Val	Ile	Ser	Val	Thr	Pro
			180					185					190		

Gly Lys Arg Tyr Arg Phe Arg Leu Val Ser Leu Ser Cys Asp Pro Asn
 195 200 205
 Tyr Thr Phe Ser Ile Asp Gly His Asn Met Thr Ile Ile Glu Thr Asp
 210 215 220
 Ser Ile Asn Thr Ala Pro Leu Val Val Asp Ser Ile Gln Ile Phe Ala
 225 230 235 240
 Ala Gln Arg Tyr Ser Phe Val Leu Glu Ala Asn Gln Ala Val Asp Asn
 245 250 255
 Tyr Trp Ile Arg Ala Asn Pro Asn Phe Gly Asn Val Gly Phe Thr Gly
 260 265 270
 Gly Ile Asn Ser Ala Ile Leu Arg Tyr Asp Gly Ala Ala Ala Val Glu
 275 280 285
 Pro Thr Thr Thr Gln Thr Thr Ser Thr Ala Pro Leu Asn Glu Val Asn
 290 295 300
 Leu His Pro Leu Val Thr Thr Ala Val Pro Gly Ser Pro Val Ala Gly
 305 310 315 320
 Gly Val Asp Leu Ala Ile Asn Met Ala Phe Asn Phe Asn Gly Thr Asn
 325 330 335
 Phe Phe Ile Asn Gly Ala Ser Phe Thr Pro Pro Thr Val Pro Val Leu
 340 345 350
 Leu Gln Ile Ile Ser Gly Ala Gln Asn Ala Gln Asp Leu Leu Pro Ser
 355 360 365
 Gly Ser Val Tyr Ser Leu Pro Ser Asn Ala Asp Ile Glu Ile Ser Phe
 370 375 380
 Pro Ala Thr Ala Ala Ala Pro Gly Ala Pro His Pro Phe His Leu His
 385 390 395 400
 Gly His Ala Phe Ala Val Val Arg Ser Ala Gly Ser Thr Val Tyr Asn
 405 410 415
 Tyr Asp Asn Pro Ile Phe Arg Asp Val Val Ser Thr Gly Thr Pro Ala
 420 425 430
 Ala Gly Asp Asn Val Thr Ile Arg Phe Arg Thr Asp Asn Pro Gly Pro
 435 440 445
 Trp Phe Leu His Cys His Ile Asp Phe His Leu Glu Ala Gly Phe Ala
 450 455 460
 Val Val Phe Ala Glu Asp Ile Pro Asp Val Ala Ser Ala Asn Pro Val
 465 470 475 480
 Pro Gln Ala Trp Ser Asp Leu Cys Pro Thr Tyr Asp Ala Leu Asp Pro
 485 490 495
 Ser Asp Gln

(2) INFORMATION FOR SEQ ID NO: 3:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 499 amino acids
- (B) TYPE: amino acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 3:

Ala	Ile	Gly	Pro	Val	Ala	Ser	Leu	Val	Val	Ala	Asn	Ala	Pro	Val	Ser	1	5	10	15
Pro	Asp	Gly	Phe	Leu	Arg	Asp	Ala	Ile	Val	Val	Asn	Gly	Val	Val	Pro	20	25	30	
Ser	Pro	Leu	Ile	Thr	Gly	Lys	Lys	Gly	Asp	Arg	Phe	Gln	Leu	Asn	Val	35	40	45	
Val	Asp	Thr	Leu	Thr	Asn	His	Ser	Met	Leu	Lys	Ser	Thr	Ser	Ile	His	50	55	60	
Trp	His	Gly	Phe	Phe	Gln	Ala	Gly	Thr	Asn	Trp	Ala	Glu	Gly	Pro	Ala	65	70	75	80
Phe	Val	Asn	Gln	Cys	Pro	Ile	Ala	Ser	Gly	His	Ser	Phe	Leu	Tyr	Asp	85	90	95	
Phe	His	Val	Pro	Asp	Gln	Ala	Gly	Thr	Phe	Trp	Tyr	His	Ser	His	Leu	100	105	110	
Ser	Thr	Gln	Tyr	Cys	Asp	Gly	Leu	Arg	Gly	Pro	Phe	Val	Val	Tyr	Asp	115	120	125	
Pro	Lys	Asp	Pro	His	Ala	Ser	Arg	Tyr	Asp	Val	Asp	Asn	Glu	Ser	Thr	130	135	140	
Val	Ile	Thr	Leu	Thr	Asp	Trp	Tyr	His	Thr	Ala	Ala	Arg	Leu	Gly	Pro	145	150	155	160
Lys	Phe	Pro	Leu	Gly	Ala	Asp	Ala	Thr	Leu	Ile	Asn	Gly	Leu	Gly	Arg	165	170	175	
Ser	Ala	Ser	Thr	Pro	Thr	Ala	Ala	Leu	Ala	Val	Ile	Asn	Val	Gln	His	180	185	190	
Gly	Lys	Arg	Tyr	Arg	Phe	Arg	Leu	Val	Ser	Ile	Ser	Cys	Asp	Pro	Asn	195	200	205	
Tyr	Thr	Phe	Ser	Ile	Asp	Gly	His	Asn	Leu	Thr	Val	Ile	Glu	Val	Asp	210	215	220	
Gly	Ile	Asn	Ser	Gln	Pro	Leu	Leu	Val	Asp	Ser	Ile	Gln	Ile	Phe	Ala	225	230	235	240
Ala	Gln	Arg	Tyr	Ser	Phe	Val	Leu	Asn	Ala	Asn	Gln	Thr	Val	Gly	Asn	245	250	255	
Tyr	Trp	Val	Arg	Ala	Asn	Pro	Asn	Phe	Gly	Thr	Val	Gly	Phe	Ala	Gly	260	265	270	
Gly	Ile	Asn	Ser	Ala	Ile	Leu	Arg	Tyr	Gln	Gly	Ala	Pro	Val	Ala	Glu	275	280	285	
Pro	Thr	Thr	Thr	Gln	Thr	Pro	Ser	Val	Ile	Pro	Leu	Ile	Glu	Thr	Asn	290	295	300	
Leu	His	Pro	Leu	Ala	Arg	Met	Pro	Val	Pro	Gly	Ser	Pro	Thr	Pro	Gly	305	310	315	320
Gly	Val	Asp	Lys	Ala	Leu	Asn	Leu	Ala	Phe	Asn	Phe	Asn	Gly	Thr	Asn	325	330	335	

Phe Phe Ile Asn Asn Ala Thr Phe Thr Pro Pro Thr Val Pro Val Leu
 340 345 350
 Leu Gln Ile Leu Ser Gly Ala Gln Thr Ala Gln Asp Leu Leu Pro Ala
 355 360 365
 Gly Ser Val Tyr Pro Leu Pro Ala His Ser Thr Ile Glu Ile Thr Leu
 370 375 380
 Pro Ala Thr Ala Leu Ala Pro Gly Ala Pro His Pro Phe His Leu His
 385 390 395 400
 Gly His Ala Phe Ala Val Val Arg Ser Ala Gly Ser Thr Thr Tyr Asn
 405 410 415
 Tyr Asn Asp Pro Ile Phe Arg Asp Val Val Ser Thr Gly Thr Pro Ala
 420 425 430
 Ala Gly Asp Asn Val Thr Ile Arg Phe Gln Thr Asp Asn Pro Gly Pro
 435 440 445
 Trp Phe Leu His Cys His Ile Asp Phe His Leu Asp Ala Gly Phe Ala
 450 455 460
 Ile Val Phe Ala Glu Asp Val Ala Asp Val Lys Ala Ala Asn Pro Val
 465 470 475 480
 Pro Lys Ala Trp Ser Asp Leu Cys Pro Ile Tyr Asp Gly Leu Ser Glu
 485 490 495
 Ala Asn Gln

(2) INFORMATION FOR SEQ ID NO: 4:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 548 amino acids
- (B) TYPE: amino acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 4:

Met His Thr Phe Leu Arg Ser Thr Ala Leu Val Val Ala Gly Leu Ser
 1 5 10 15
 Ala Arg Ala Leu Ala Ser Ile Gly Pro Val Thr Asp Phe His Ile Val
 20 25 30
 Asn Ala Ala Val Ser Pro Asp Gly Phe Ser Arg Gln Ala Val Leu Ala
 35 40 45
 Glu Gly Val Phe Pro Gly Pro Leu Ile Ala Gly Asn Lys Gly Asp Asn
 50 55 60
 Phe Gln Ile Asn Val Ile Asp Glu Leu Thr Asn Ala Thr Met Leu Lys
 65 70 75 80
 Thr Thr Thr Ile His Trp His Gly Phe Phe Gln His Gly Thr Asn Trp
 85 90 95
 Ala Asp Gly Pro Ala Phe Ile Asn Gln Cys Pro Ile Ala Ser Gly Asp
 100 105 110

Ser	Phe	Leu	Tyr	Asn	Phe	Gln	Val	Pro	Asp	Gln	Ala	Gly	Thr	Phe	Trp
		115					120					125			
Tyr	His	Ser	His	Leu	Ser	Thr	Gln	Tyr	Cys	Asp	Gly	Leu	Arg	Gly	Pro
	130					135					140				
Phe	Val	Val	Tyr	Asp	Pro	Ala	Asp	Pro	Tyr	Leu	Asp	Gln	Tyr	Asp	Val
145					150					155					160
Asp	Asp	Asp	Ser	Thr	Val	Ile	Thr	Leu	Ala	Asp	Trp	Tyr	His	Thr	Ala
				165					170					175	
Ala	Arg	Leu	Gly	Ser	Pro	Phe	Pro	Ala	Ala	Asp	Thr	Thr	Leu	Ile	Asn
			180					185					190		
Gly	Leu	Gly	Arg	Cys	Gly	Glu	Ala	Gly	Cys	Pro	Val	Ser	Asp	Leu	Ala
		195					200					205			
Val	Ile	Ser	Val	Thr	Lys	Gly	Lys	Arg	Tyr	Arg	Phe	Arg	Leu	Val	Ser
	210					215					220				
Ile	Ser	Cys	Asp	Ser	Phe	Phe	Thr	Phe	Ser	Ile	Asp	Gly	His	Ser	Leu
225					230					235					240
Asn	Val	Ile	Glu	Val	Asp	Ala	Thr	Asn	His	Gln	Pro	Leu	Thr	Val	Asp
				245					250					255	
Glu	Leu	Thr	Ile	Tyr	Ala	Gly	Gln	Arg	Tyr	Ser	Phe	Ile	Leu	Thr	Ala
			260					265					270		
Asp	Gln	Asp	Val	Asp	Asn	Tyr	Trp	Ile	Arg	Ala	Asn	Pro	Gly	Ile	Gly
		275					280					285			
Ile	Thr	Thr	Gly	Phe	Ala	Gly	Gly	Ile	Asn	Ser	Ala	Ile	Leu	Arg	Tyr
	290					295					300				
Asp	Gly	Ala	Asp	Val	Val	Glu	Pro	Thr	Thr	Thr	Gln	Ala	Thr	Ser	Pro
305					310					315					320
Val	Val	Leu	Ser	Glu	Ser	Asn	Leu	Ala	Pro	Leu	Thr	Asn	Ala	Ala	Ala
				325					330					335	
Pro	Gly	Leu	Pro	Glu	Val	Gly	Gly	Val	Asp	Leu	Ala	Leu	Asn	Phe	Asn
			340					345					350		
Leu	Thr	Phe	Asp	Gly	Pro	Ser	Leu	Lys	Phe	Gln	Ile	Asn	Gly	Val	Thr
		355					360					365			
Phe	Val	Pro	Pro	Thr	Val	Pro	Val	Leu	Leu	Gln	Ile	Leu	Ser	Gly	Ala
	370					375					380				
Gln	Ser	Ala	Ala	Asp	Leu	Leu	Pro	Ser	Gly	Ser	Val	Tyr	Ala	Leu	Pro
385					390					395					400
Ser	Asn	Ala	Thr	Ile	Glu	Leu	Ser	Leu	Pro	Ala	Gly	Ala	Leu	Gly	Gly
				405						410				415	
Pro	His	Pro	Phe	His	Leu	His	Gly	His	Thr	Phe	Ser	Val	Val	Arg	Pro
			420					425					430		
Ala	Gly	Ser	Thr	Thr	Tyr	Asn	Tyr	Val	Asn	Pro	Val	Gln	Arg	Asp	Val
		435					440					445			
Val	Ser	Ile	Gly	Asn	Thr	Gly	Asp	Asn	Val	Thr	Ile	Arg	Phe	Asp	Thr
	450					455					460				
Asn															

465		470		475		480									
Glu	Ala	Ala	Leu	Pro	Leu	Arg	Thr	Ser	Leu	Thr	Leu	Arg			
			485			490					495				
Pro	Leu	Thr	Leu	Ser	Pro	Arg	Thr	Gly	Pro	Thr	Cys	Ala	Leu	Ser	Thr
			500					505					510		
Thr	Leu	Trp	Thr	His	Leu	Ile	Thr	Ser	Gly	Phe	Ala	Ser	Ile	Ile	Gln
		515					520					525			
Trp	Met	Met	Gly	Gly	Asn	Gly	Leu	Phe	Ala	Pro	His	Ala	Leu	Ser	Phe
	530					535					540				
Leu	Gly	Ser	Gln												
545															

(2) INFORMATION FOR SEQ ID NO: 5:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 529 amino acids
- (B) TYPE: amino acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 5:

Met	Leu	Ser	Ser	Ile	Thr	Leu	Leu	Pro	Leu	Leu	Ala	Ala	Val	Ser	Thr
1				5					10					15	
Pro	Ala	Phe	Ala	Ala	Val	Arg	Asn	Tyr	Lys	Phe	Asp	Ile	Lys	Asn	Val
			20					25					30		
Asn	Val	Ala	Pro	Asp	Gly	Phe	Gln	Arg	Ser	Ile	Val	Ser	Val	Asn	Gly
		35					40					45			
Leu	Val	Pro	Gly	Thr	Leu	Ile	Thr	Ala	Asn	Lys	Gly	Asp	Thr	Leu	Arg
	50					55					60				
Ile	Asn	Val	Thr	Asn	Gln	Leu	Thr	Asp	Pro	Ser	Met	Arg	Arg	Ala	Thr
65					70				75						80
Thr	Ile	His	Trp	His	Gly	Leu	Phe	Gln	Ala	Thr	Thr	Ala	Asp	Glu	Asp
			85						90					95	
Gly	Pro	Ala	Phe	Val	Thr	Gln	Cys	Pro	Ile	Ala	Gln	Asn	Leu	Ser	Tyr
			100					105					110		
Thr	Tyr	Glu	Ile	Pro	Leu	Arg	Gly	Gln	Thr	Gly	Thr	Met	Trp	Tyr	His
		115					120					125			
Ala	His	Leu	Ala	Ser	Gln	Tyr	Val	Asp	Gly	Leu	Arg	Gly	Pro	Leu	Val
		130				135					140				
Ile	Tyr	Asp	Pro	Asn	Asp	Pro	His	Lys	Ser	Arg	Tyr	Asp	Val	Asp	Asp
145					150					155					160
Ala	Ser	Thr	Val	Val	Met	Leu	Glu	Asp	Trp	Tyr	His	Thr	Pro	Ala	Pro
				165					170					175	
Val	Leu	Glu	Lys	Gln	Met	Phe	Ser	Thr	Asn	Asn	Thr	Ala	Leu	Leu	Ser
			180					185					190		

Pro Val Pro Asp Ser Gly Leu Ile Asn Gly Lys Gly Arg Tyr Val Gly
 195 200 205
 Gly Pro Ala Val Pro Arg Ser Val Ile Asn Val Lys Arg Gly Lys Arg
 210 215 220
 Tyr Arg Leu Arg Val Ile Asn Ala Ser Ala Ile Gly Ser Phe Thr Phe
 225 230 235 240
 Ser Ile Glu Gly His Ser Leu Thr Val Ile Glu Ala Asp Gly Ile Leu
 245 250 255
 His Gln Pro Leu Ala Val Asp Ser Phe Gln Ile Tyr Ala Gly Gln Arg
 260 265 270
 Tyr Ser Val Ile Val Glu Ala Asn Gln Thr Ala Ala Asn Tyr Trp Ile
 275 280 285
 Arg Ala Pro Met Thr Val Ala Gly Ala Gly Thr Asn Ala Asn Leu Asp
 290 295 300
 Pro Thr Asn Val Phe Ala Val Leu His Tyr Glu Gly Ala Pro Asn Ala
 305 310 315 320
 Glu Pro Thr Thr Glu Gln Gly Ser Ala Ile Gly Thr Ala Leu Val Glu
 325 330 335
 Glu Asn Leu His Ala Leu Ile Asn Pro Gly Ala Pro Gly Gly Ser Ala
 340 345 350
 Pro Ala Asp Val Ser Leu Asn Leu Ala Ile Gly Arg Ser Thr Val Asp
 355 360 365
 Gly Ile Leu Arg Phe Thr Phe Asn Asn Ile Lys Tyr Glu Ala Pro Ser
 370 375 380
 Leu Pro Thr Leu Leu Lys Ile Leu Ala Asn Asn Ala Ser Asn Asp Ala
 385 390 395 400
 Asp Phe Thr Pro Asn Glu His Thr Ile Val Leu Pro His Asn Lys Val
 405 410 415
 Ile Glu Leu Asn Ile Thr Gly Gly Ala Asp His Pro Ile His Leu His
 420 425 430
 Gly His Val Phe Asp Ile Val Lys Ser Leu Gly Gly Thr Pro Asn Tyr
 435 440 445
 Val Asn Pro Pro Arg Arg Asp Val Val Arg Val Gly Gly Thr Gly Val
 450 455 460
 Val Leu Arg Phe Lys Thr Asp Asn Pro Gly Pro Trp Phe Val His Cys
 465 470 475 480
 His Ile Asp Trp His Leu Glu Ala Gly Leu Ala Leu Val Phe Ala Glu
 485 490 495
 Ala Pro Ser Gln Ile Arg Gln Gly Val Gln Ser Val Gln Pro Asn Asn
 500 505 510
 Ala Trp Asn Gln Leu Cys Pro Lys Tyr Ala Ala Leu Pro Pro Asp Leu
 515 520 525
 Gln

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 599 amino acids
 (B) TYPE: amino acid
 (C) STRANDEDNESS: single
 (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 6:

Met	Ala	Arg	Ser	Thr	Thr	Ser	Leu	Phe	Ala	Leu	Ser	Leu	Val	Ala	Ser	1	5	10	15
Ala	Phe	Ala	Arg	Val	Val	Asp	Tyr	Gly	Phe	Asp	Val	Ala	Asn	Gly	Ala	20	25	30	
Val	Ala	Pro	Asp	Gly	Val	Thr	Arg	Asn	Ala	Val	Leu	Val	Asn	Gly	Arg	35	40	45	
Phe	Pro	Gly	Pro	Leu	Ile	Thr	Ala	Asn	Lys	Gly	Asp	Thr	Leu	Lys	Ile	50	55	60	
Thr	Val	Arg	Asn	Lys	Leu	Ser	Asp	Pro	Thr	Met	Arg	Arg	Ser	Thr	Thr	65	70	75	80
Ile	His	Trp	His	Gly	Leu	Leu	Gln	His	Arg	Thr	Ala	Glu	Glu	Asp	Gly	85	90	95	
Pro	Ala	Phe	Val	Thr	Gln	Cys	Pro	Ile	Pro	Pro	Gln	Glu	Ser	Tyr	Thr	100	105	110	
Tyr	Thr	Met	Pro	Leu	Gly	Glu	Gln	Thr	Gly	Thr	Tyr	Trp	Tyr	His	Ser	115	120	125	
His	Leu	Ser	Ser	Gln	Tyr	Val	Asp	Gly	Leu	Arg	Gly	Pro	Ile	Val	Ile	130	135	140	
Tyr	Asp	Pro	His	Asp	Pro	Tyr	Arg	Asn	Tyr	Tyr	Asp	Val	Asp	Asp	Glu	145	150	155	160
Arg	Thr	Val	Phe	Thr	Leu	Ala	Asp	Trp	Tyr	His	Thr	Pro	Ser	Glu	Ala	165	170	175	
Ile	Ile	Ala	Thr	His	Asp	Val	Leu	Lys	Thr	Ile	Pro	Asp	Ser	Gly	Thr	180	185	190	
Ile	Asn	Gly	Lys	Gly	Lys	Tyr	Asp	Pro	Ala	Ser	Ala	Asn	Thr	Asn	Asn	195	200	205	
Thr	Thr	Leu	Glu	Asn	Leu	Tyr	Thr	Leu	Lys	Val	Lys	Arg	Gly	Lys	Arg	210	215	220	
Tyr	Arg	Leu	Arg	Ile	Ile	Asn	Ala	Ser	Ala	Ile	Ala	Ser	Phe	Arg	Phe	225	230	235	240
Gly	Val	Gln	Gly	His	Lys	Cys	Thr	Ile	Ile	Glu	Ala	Asp	Gly	Val	Leu	245	250	255	
Thr	Lys	Pro	Ile	Glu	Val	Asp	Ala	Phe	Asp	Ile	Leu	Ala	Gly	Gln	Arg	260	265	270	
Tyr	Ser	Cys	Ile	Leu	Lys	Ala	Asp	Gln	Asp	Pro	Asp	Ser	Tyr	Trp	Ile	275	280	285	
Asn	Ala	Pro	Ile	Thr	Asn	Val	Leu	Asn	Thr	Asn	Val	Gln	Ala	Leu	Leu	290	295	300	

Val Tyr Glu Asp Asp Lys Arg Pro Thr His Tyr Pro Trp Lys Pro Phe
 305 310 315 320
 Leu Thr Trp Lys Ile Ser Asn Glu Ile Ile Gln Tyr Trp Gln His Lys
 325 330 335
 His Gly Ser His Gly His Lys Gly Lys Gly His His His Lys Val Arg
 340 345 350
 Ala Ile Gly Gly Val Ser Gly Leu Ser Ser Arg Val Lys Ser Arg Ala
 355 360 365
 Ser Asp Leu Ser Lys Lys Ala Val Glu Leu Ala Ala Ala Leu Val Ala
 370 375 380
 Gly Glu Ala Glu Leu Asp Lys Arg Gln Asn Glu Asp Asn Ser Thr Ile
 385 390 395 400
 Val Leu Asp Glu Thr Lys Leu Ile Pro Leu Val Gln Pro Gly Ala Pro
 405 410 415
 Gly Gly Ser Arg Pro Ala Asp Val Val Val Pro Leu Asp Phe Gly Leu
 420 425 430
 Asn Phe Ala Asn Gly Leu Trp Thr Ile Asn Asn Val Ser Tyr Ser Pro
 435 440 445
 Pro Asp Val Pro Thr Leu Leu Lys Ile Leu Thr Asp Lys Asp Lys Val
 450 455 460
 Asp Ala Ser Asp Phe Thr Ala Asp Glu His Thr Tyr Ile Leu Pro Lys
 465 470 475 480
 Asn Gln Val Val Glu Leu His Ile Lys Gly Gln Ala Leu Gly Ile Val
 485 490 495
 His Pro Leu His Leu His Gly His Ala Phe Asp Val Val Gln Phe Gly
 500 505 510
 Asp Asn Ala Pro Asn Tyr Val Asn Pro Pro Arg Arg Asp Val Val Gly
 515 520 525
 Val Thr Asp Ala Gly Val Arg Ile Gln Phe Arg Thr Asp Asn Pro Gly
 530 535 540
 Pro Trp Phe Leu His Cys His Ile Asp Trp His Leu Glu Glu Gly Phe
 545 550 555 560
 Ala Met Val Phe Ala Glu Ala Pro Glu Asp Ile Lys Lys Gly Ser Gln
 565 570 575
 Ser Val Lys Pro Asp Gly Gln Trp Lys Lys Leu Cys Glu Lys Tyr Glu
 580 585 590
 Lys Leu Pro Glu Ala Leu Gln
 595

(2) INFORMATION FOR SEQ ID NO: 7:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 572 amino acids
- (B) TYPE: amino acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: protein

Met 1	Ala	Arg	Thr	Thr 5	Phe	Leu	Val	Ser	Val 10	Ser	Leu	Phe	Val	Ser 15	Ala
Val	Leu	Ala	Arg 20	Thr	Val	Glu	Tyr	Asn 25	Leu	Lys	Ile	Ser	Asn 30	Gly	Lys
Ile	Ala	Pro 35	Asp	Gly	Val	Glu	Arg 40	Asp	Ala	Thr	Leu	Val 45	Asn	Gly	Gly
Tyr	Pro 50	Gly	Pro	Leu	Ile	Phe 55	Ala	Asn	Lys	Gly	Asp 60	Thr	Leu	Lys	Val
Lys 65	Val	Gln	Asn	Lys	Leu 70	Thr	Asn	Pro	Asp	Met 75	Tyr	Arg	Thr	Thr	Ser 80
Ile	His	Trp	His	Gly 85	Leu	Leu	Gln	His	Arg 90	Asn	Ala	Asp	Asp	Asp 95	Gly
Pro	Ala	Phe	Val 100	Thr	Gln	Cys	Pro	Ile 105	Val	Pro	Gln	Ala	Ser 110	Tyr	Thr
Tyr	Thr	Met 115	Pro	Leu	Gly	Asp	Gln 120	Thr	Gly	Thr	Tyr	Trp 125	Tyr	His	Ser
His	Leu 130	Ser	Ser	Gln	Tyr	Val 135	Asp	Gly	Leu	Arg	Gly 140	Pro	Leu	Val	Ile
Tyr 145	Asp	Pro	Lys	Asp	Pro 150	His	Arg	Arg	Leu	Tyr 155	Asp	Ile	Asp	Asp	Glu 160
Lys	Thr	Val	Leu	Ile 165	Ile	Gly	Asp	Trp	Tyr 170	His	Thr	Ser	Ser	Lys 175	Ala
Ile	Leu	Ala	Thr 180	Gly	Asn	Ile	Thr	Leu 185	Gln	Gln	Pro	Asp	Ser 190	Ala	Thr
Ile	Asn	Gly 195	Lys	Gly	Arg	Phe	Asp 200	Pro	Asp	Asn	Thr	Pro 205	Ala	Asn	Pro
Asn	Thr 210	Leu	Tyr	Thr	Leu	Lys 215	Val	Lys	Arg	Gly	Lys 220	Arg	Tyr	Arg	Leu
Arg 225	Val	Ile	Asn	Ser	Ser 230	Ala	Ile	Ala	Ser	Phe 235	Arg	Met	Ser	Ile	Gln 240
Gly	His	Lys	Met 245	Thr	Val	Ile	Ala	Ala	Asp 250	Gly	Val	Ser	Thr	Lys 255	Pro
Tyr	Gln	Val	Asp 260	Ser	Phe	Asp	Ile 265	Leu	Ala	Gly	Gln	Arg	Ile 270	Asp	Ala
Val	Val	Glu 275	Ala	Asn	Gln	Glu	Pro 280	Asp	Thr	Tyr	Trp	Ile 285	Asn	Ala	Pro
Leu	Thr 290	Asn	Val	Ala	Asn	Lys 295	Thr	Ala	Gln	Ala	Leu 300	Leu	Ile	Tyr	Glu
Asp 305	Asp	Arg	Arg	Pro	Tyr 310	His	Pro	Pro	Lys	Gly 315	Pro	Tyr	Arg	Lys	Trp 320
Ser	Val	Ser	Glu	Ala 325	Ile	Ile	Lys	Tyr	Trp 330	Lys	His	Lys	His	Gly 335	Arg
Gly	Leu	Leu	Ser 340	Gly	His	Gly	Gly	Leu 345	Lys	Ala	Arg	Met	Met 350	Glu	Gly

Ser Leu His Leu His Gly Arg Arg Asp Ile Val Lys Arg Gln Asn Glu
 355 360 365
 Thr Thr Thr Val Val Met Asp Glu Thr Lys Leu Val Pro Leu Glu His
 370 375 380
 Pro Gly Ala Ala Cys Gly Ser Lys Pro Ala Asp Leu Val Ile Asp Leu
 385 390 395 400
 Thr Phe Gly Val Asn Phe Thr Thr Gly His Trp Met Ile Asn Gly Ile
 405 410 415
 Pro His Lys Ser Pro Asp Met Pro Thr Leu Leu Lys Ile Leu Thr Asp
 420 425 430
 Thr Asp Gly Val Thr Glu Ser Asp Phe Thr Gln Pro Glu His Thr Ile
 435 440 445
 Ile Leu Pro Lys Asn Lys Cys Val Glu Phe Asn Ile Lys Gly Asn Ser
 450 455 460
 Gly Leu Gly Ile Val His Pro Ile His Leu His Gly His Thr Phe Asp
 465 470 475 480
 Val Val Gln Phe Gly Asn Asn Pro Pro Asn Tyr Val Asn Pro Pro Arg
 485 490 495
 Arg Asp Val Val Gly Ala Thr Asp Glu Gly Val Arg Phe Gln Phe Lys
 500 505 510
 Thr Asp Asn Pro Gly Pro Trp Phe Leu His Cys His Ile Asp Trp His
 515 520 525
 Leu Glu Glu Gly Phe Ala Met Val Phe Ala Glu Ala Pro Glu Ala Ile
 530 535 540
 Lys Gly Gly Pro Lys Ser Val Pro Val Asp Arg Gln Trp Lys Asp Leu
 545 550 555 560
 Cys Arg Lys Tyr Gly Ser Leu Pro Ala Gly Phe Leu
 565 570

(2) INFORMATION FOR SEQ ID NO: 8:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 575 amino acids
- (B) TYPE: amino acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 8:

Met Ala Arg Thr Thr Phe Leu Val Ser Val Ser Leu Phe Val Ser Ala
 1 5 10 15
 Val Leu Ala Arg Thr Val Glu Tyr Gly Leu Lys Ile Ser Asp Gly Glu
 20 25 30
 Ile Ala Pro Asp Gly Val Lys Arg Asn Ala Thr Leu Val Asn Gly Gly
 35 40 45
 Tyr Pro Gly Pro Leu Ile Phe Ala Asn Lys Gly Asp Thr Leu Lys Val
 50 55 60

[illegible]

		420		425		430													
Glu	Asp	Gly	Val	Thr	Glu	Ser	Asp	Phe	Thr	Lys	Glu	Glu	His	Thr	Val				
		435					440					445							
Ile	Leu	Pro	Lys	Asn	Lys	Cys	Ile	Glu	Phe	Asn	Ile	Lys	Gly	Asn	Ser				
	450					455					460								
Gly	Ile	Pro	Ile	Thr	His	Pro	Val	His	Leu	His	Gly	His	Thr	Trp	Asp				
465					470					475					480				
Val	Val	Gln	Phe	Gly	Asn	Asn	Pro	Pro	Asn	Tyr	Val	Asn	Pro	Pro	Arg				
				485					490					495					
Arg	Asp	Val	Val	Gly	Ser	Thr	Asp	Ala	Gly	Val	Arg	Ile	Gln	Phe	Lys				
			500					505					510						
Thr	Asp	Asn	Pro	Gly	Pro	Trp	Phe	Leu	His	Cys	His	Ile	Asp	Trp	His				
		515					520					525							
Leu	Glu	Glu	Gly	Phe	Ala	Met	Val	Phe	Ala	Glu	Ala	Pro	Glu	Ala	Val				
	530					535					540								
Lys	Gly	Gly	Pro	Lys	Ser	Val	Ala	Val	Asp	Ser	Gln	Trp	Glu	Gly	Leu				
545					550					555					560				
Cys	Gly	Lys	Tyr	Asp	Asn	Trp	Leu	Lys	Ser	Asn	Pro	Gly	Gln	Leu					
				565					570					575					

(2) INFORMATION FOR SEQ ID NO: 9:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 616 amino acids
- (B) TYPE: amino acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 9:

Met	Lys	Arg	Phe	Phe	Ile	Asn	Ser	Leu	Leu	Leu	Leu	Ala	Gly	Leu	Leu				
1				5					10					15					
Asn	Ser	Gly	Ala	Leu	Ala	Ala	Pro	Ser	Thr	His	Pro	Arg	Ser	Asn	Pro				
			20					25					30						
Asp	Ile	Leu	Leu	Glu	Arg	Asp	Asp	His	Ser	Leu	Thr	Ser	Arg	Gln	Gly				
		35				40						45							
Ser	Cys	His	Ser	Pro	Ser	Asn	Arg	Ala	Cys	Trp	Cys	Ser	Gly	Phe	Asp				
	50					55					60								
Ile	Asn	Thr	Asp	Tyr	Glu	Thr	Lys	Thr	Pro	Asn	Thr	Gly	Val	Val	Arg				
65					70				75					80					
Arg	Tyr	Thr	Phe	Asp	Ile	Thr	Glu	Val	Asp	Asn	Arg	Pro	Gly	Pro	Asp				
				85					90					95					
Gly	Val	Ile	Lys	Glu	Lys	Leu	Met	Leu	Ile	Asn	Asp	Lys	Leu	Leu	Gly				
			100					105					110						
Pro	Thr	Val	Phe	Ala	Asn	Trp	Gly	Asp	Thr	Ile	Glu	Val	Thr	Val	Asn				
		115					120					125							

Asn	His	Leu	Arg	Thr	Asn	Gly	Thr	Ser	Ile	His	Trp	His	Gly	Leu	His
	130					135					140				
Gln	Lys	Gly	Thr	Asn	Tyr	His	Asp	Gly	Ala	Asn	Gly	Val	Thr	Glu	Cys
145					150					155					160
Pro	Ile	Pro	Pro	Gly	Gly	Ser	Arg	Val	Tyr	Ser	Phe	Arg	Ala	Arg	Gln
				165					170					175	
Tyr	Gly	Thr	Ser	Trp	Tyr	His	Ser	His	Phe	Ser	Ala	Gln	Tyr	Gly	Asn
			180					185					190		
Gly	Val	Ser	Gly	Ala	Ile	Gln	Ile	Asn	Gly	Pro	Ala	Ser	Leu	Pro	Tyr
		195					200					205			
Asp	Ile	Asp	Leu	Gly	Val	Leu	Pro	Leu	Xaa	Asp	Trp	Tyr	Tyr	Lys	Ser
	210					215					220				
Ala	Asp	Gln	Leu	Val	Ile	Glu	Thr	Leu	Xaa	Lys	Gly	Asn	Ala	Pro	Phe
225					230					235					240
Ser	Asp	Asn	Val	Leu	Ile	Asn	Gly	Thr	Ala	Lys	His	Pro	Thr	Thr	Gly
			245						250					255	
Glu	Gly	Glu	Tyr	Ala	Ile	Val	Lys	Leu	Thr	Pro	Asp	Lys	Arg	His	Arg
			260					265					270		
Leu	Arg	Leu	Ile	Asn	Met	Ser	Val	Glu	Asn	His	Phe	Gln	Val	Ser	Leu
		275					280					285			
Ala	Lys	His	Thr	Met	Thr	Val	Ile	Ala	Ala	Asp	Met	Val	Pro	Val	Asn
	290					295					300				
Ala	Met	Thr	Val	Asp	Ser	Leu	Phe	Met	Ala	Val	Gly	Gln	Arg	Tyr	Asp
305					310					315					320
Val	Thr	Ile	Asp	Ala	Ser	Gln	Ala	Val	Gly	Asn	Tyr	Trp	Phe	Asn	Ile
				325					330					335	
Thr	Phe	Gly	Gly	Gln	Gln	Lys	Cys	Gly	Phe	Ser	His	Asn	Pro	Ala	Pro
			340					345					350		
Ala	Ala	Ile	Phe	Arg	Tyr	Glu	Gly	Ala	Pro	Asp	Ala	Leu	Pro	Thr	Asp
		355					360					365			
Pro	Gly	Ala	Ala	Pro	Lys	Asp	His	Gln	Cys	Leu	Asp	Thr	Leu	Asp	Leu
	370					375					380				
Ser	Pro	Val	Val	Gln	Lys	Asn	Val	Pro	Val	Asp	Gly	Phe	Val	Lys	Glu
385					390					395				400	
Pro	Gly	Asn	Thr	Leu	Pro	Val	Thr	Leu	His	Val	Asp	Gln	Ala	Ala	Ala
				405					410					415	
Pro	His	Val	Phe	Thr	Trp	Lys	Ile	Asn	Gly	Ser	Ala	Ala	Asp	Val	Asp
			420					425					430		
Trp	Asp	Arg	Pro	Val	Leu	Glu	Tyr	Val	Met	Asn	Asn	Asp	Leu	Ser	Ser
		435					440					445			
Ile	Pro	Val	Lys	Asn	Asn	Ile	Val	Arg	Val	Asp	Gly	Val	Asn	Glu	Trp
	450					455					460				
Thr	Tyr	Trp	Leu	Val	Glu	Asn	Asp	Pro	Glu	Gly	Arg	Leu	Ser	Leu	Pro
465					470					475					480
His															

(2) INFORMATION FOR SEQ ID NO: 10:

(A) LENGTH: 573 amino acids
(B) TYPE: amino acid
(C) STRANDEDNESS: single
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 10:

Gln 1	Gln	Ser	Cys	Asn 5	Thr	Pro	Ser	Asn	Arg 10	Ala	Cys	Trp	Thr	Asp 15	Gly
Tyr	Asp	Ile	Asn 20	Thr	Asp	Tyr	Glu	Val 25	Asp	Ser	Pro	Asp	Thr 30	Gly	Val
Val	Arg	Pro 35	Tyr	Thr	Leu	Thr	Leu 40	Thr	Glu	Val	Asp	Asn 45	Trp	Thr	Gly
Pro	Asp 50	Gly	Val	Val	Lys	Glu 55	Lys	Val	Met	Leu	Val 60	Asn	Asn	Ser	Ile
Ile 65	Gly	Pro	Thr	Ile	Phe 70	Ala	Asp	Trp	Gly	Asp 75	Thr	Ile	Gln	Val	Thr 80
Val	Ile	Asn	Asn	Leu 85	Glu	Thr	Asn	Gly	Thr 90	Ser	Ile	His	Trp	His 95	Gly
Leu	His	Gln	Lys 100	Gly	Thr	Asn	Leu	His 105	Asp	Gly	Ala	Asn	Gly 110	Ile	Thr
Glu	Cys	Pro 115	Ile	Pro	Pro	Lys	Gly 120	Gly	Arg	Lys	Val	Tyr 125	Arg	Phe	Lys
Ala	Gln 130	Gln	Tyr	Gly	Thr	Ser 135	Trp	Tyr	His	Ser	His 140	Phe	Ser	Ala	Gln
Tyr	Gly	Asn	Gly	Val	Val	Gly	Ala	Ile	Gln	Ile	Asn	Gly	Pro	Ala	Ser

145					150					155					160
Leu	Pro	Tyr	Asp	Thr 165	Asp	Leu	Gly	Val	Phe 170	Pro	Ile	Ser	Asp	Tyr 175	Tyr
Tyr	Ser	Ser	Ala 180	Asp	Glu	Leu	Val	Glu 185	Leu	Thr	Lys	Asn	Ser 190	Gly	Ala
Pro	Phe	Ser 195	Asp	Asn	Val	Leu	Phe 200	Asn	Gly	Thr	Ala	Lys 205	His	Pro	Glu
Thr	Gly 210	Glu	Gly	Glu	Tyr	Ala 215	Asn	Val	Thr	Leu	Thr 220	Pro	Gly	Arg	Arg
His 225	Arg	Leu	Arg	Leu	Ile 230	Asn	Thr	Ser	Val	Glu 235	Asn	His	Phe	Gln	Val 240
Ser	Leu	Val	Asn	His 245	Thr	Met	Cys	Ile	Ile 250	Ala	Ala	Asp	Met	Val	Pro
Val	Asn	Ala	Met 260	Thr	Val	Asp	Ser	Leu 265	Phe	Leu	Gly	Val	Gly 270	Gln	Arg
Tyr	Asp	Val 275	Val	Ile	Glu	Ala	Asn 280	Arg	Thr	Pro	Gly	Asn 285	Tyr	Trp	Phe
Asn	Val 290	Thr	Phe	Gly	Gly	Gly 295	Leu	Leu	Cys	Gly	Gly 300	Ser	Arg	Asn	Pro
Tyr 305	Pro	Ala	Ala	Ile	Phe 310	His	Tyr	Ala	Gly	Ala 315	Pro	Gly	Gly	Pro	Pro 320
Thr	Asp	Glu	Gly	Lys 325	Ala	Pro	Val	Asp	His 330	Asn	Cys	Leu	Asp	Leu 335	Pro
Asn	Leu	Lys	Pro 340	Val	Val	Ala	Arg	Asp 345	Val	Pro	Leu	Ser	Gly 350	Phe	Ala
Lys	Arg	Ala 355	Asp	Asn	Thr	Leu	Asp 360	Val	Thr	Leu	Asp	Thr 365	Thr	Gly	Thr
Pro	Leu 370	Phe	Val	Trp	Lys	Val 375	Asn	Gly	Ser	Ala	Ile 380	Asn	Ile	Asp	Trp
Gly 385	Arg	Ala	Val	Val	Asp 390	Tyr	Val	Leu	Thr	Gln 395	Asn	Thr	Ser	Phe	Pro 400
Pro	Gly	Tyr	Asn	Ile 405	Val	Glu	Val	Asn	Gly 410	Ala	Asp	Gln	Trp	Ser 415	Tyr
Trp	Leu	Ile	Glu 420	Asn	Asp	Pro	Gly	Ala 425	Pro	Phe	Thr	Leu	Pro 430	His	Pro
Met	His	Leu 435	His	Gly	His	Asp	Phe 440	Tyr	Val	Leu	Gly	Arg 445	Ser	Pro	Asp
Glu	Ser 450	Pro	Ala	Ser	Asn	Glu 455	Arg	His	Val	Phe	Asp 460	Pro	Ala	Arg	Asp
Ala 465	Gly	Leu	Leu	Ser	Gly 470	Ala	Asn	Pro	Val	Arg 475	Arg	Asp	Val	Ser	Met 480
Leu	Pro	Ala	Phe	Gly 485	Trp	Val	Val	Leu	Ser 490	Phe	Arg	Ala	Asp	Asn 495	Pro
Gly	Ala	Trp	Leu 500	Phe	His	Cys	His	Ile 505	Ala	Trp	His	Val	Ser 510	Gly	Gly

His Arg Trp Val Glu Glu Gly Glu Trp Leu Val Lys Ala
565 570